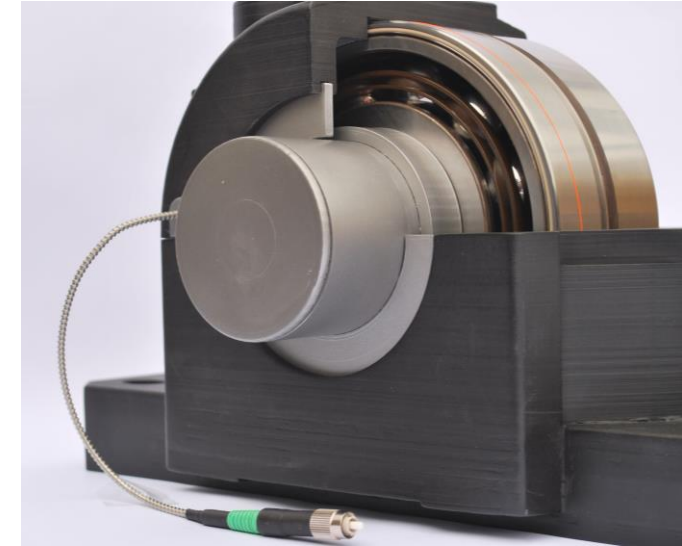


Fiber Optic load, speed & temperature sensor for rotating equipment

Smart photonic sleeve

Description

Fiber Bragg grating based load and condition sensing sleeve for rotating equipment. The product consists of multiple sensors spatially distributed in one or more fibers in the sleeve. The sleeve measures operating conditions and is placed around the bearing or on any other asset in the rotating application surviving the harshest conditions. The data is used to optimize running conditions, design and allows for condition monitoring of all crucial rotating parts of your equipment.



KEY FEATURES

- Load sensing in rotating equipment
- Load, speed and temperature (distribution) sensing all at once
- Real-time condition and remaining use of life for equipment input
- Retrofittable in application
- R&D tool to validate system design and simulations
- Makes real-time operating parameters available for operation optimization

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Patent application:
 • GB1812795.1
 • GB1904221.7

	Performance	Parameter
Performance ³	Load range ($F_{axial/radial}$)	$100 < C/P^1 > 0.2 / (100 - 2000 \mu\xi)$ – all load ranges
	Load accuracy	5% Full Spectrum
	Repeatability	1 %
	Speed sensing	50 – 3600 rpm \pm 1%
	Temperature sensing	0 – 100 °C \pm 0.5%
	Loaded zone range	0-360° \pm 5%
Interface	Output options	Profibus, DeviceNes, Modbus, Ethernet, RS485, 4-20 mA, 0-10Vdc
	Sample rate ²	10 - 2500 Hz
	Supply	220 Vac
Environment	Protection	IP67 for Sleeve not electronics (interrogator)
	Lubrication conditions	All bearing oils and greased
	Temperature range	-50 - 150°C
	Safety	ATEX zone 0

1. P is bearing load and C is bearing load rating – bearing life $L_{10} \sim (C/P)^3$

2. Customizable – depending on bearing type in combination with rotating speed

3. Combination of sleeve, interrogator and processing algorithm by Sensing360



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Product lines:

1. Add-on bearing sleeve – reduced ISO bearing size
2. Integrated bearing sleeve – same ISO bearing size
3. Separate sleeve – for other implementation



	Parameter	Value
Mechanical	Thickness ²	<u>Add-on</u> : 2-5 mm thickness – reduced ISO bearing size <u>Integrated</u> : 2 mm thickness ¹ – same ISO bearing size
	Bearing types ²	ACBB, DGBB, SRB, CRB, TRB, CARB, SRTB, NRB
	Bearing boundary dimensions ²	Max outside diameter D = 360 mm, max width B = 160 mm
	Integration position	(1) Add to bearing (sleeve as add-on) (2) Reduced bearing outer ring (integrated sleeve) (3) Housing (integrated in application) ³ (4) Gearbox / Gear ring ³ (5) Customized implementation ³
	Dimensions ²	See CAD drawings – sleeve
	Hardness	Standard 55 HRC – optional 60 HRC (bearing)
	Integration fit ²	Tolerance sleeve equal to bearing – all fits possible

¹ Needs bearing OR modification

² Customization possible

³ Application integration customizable

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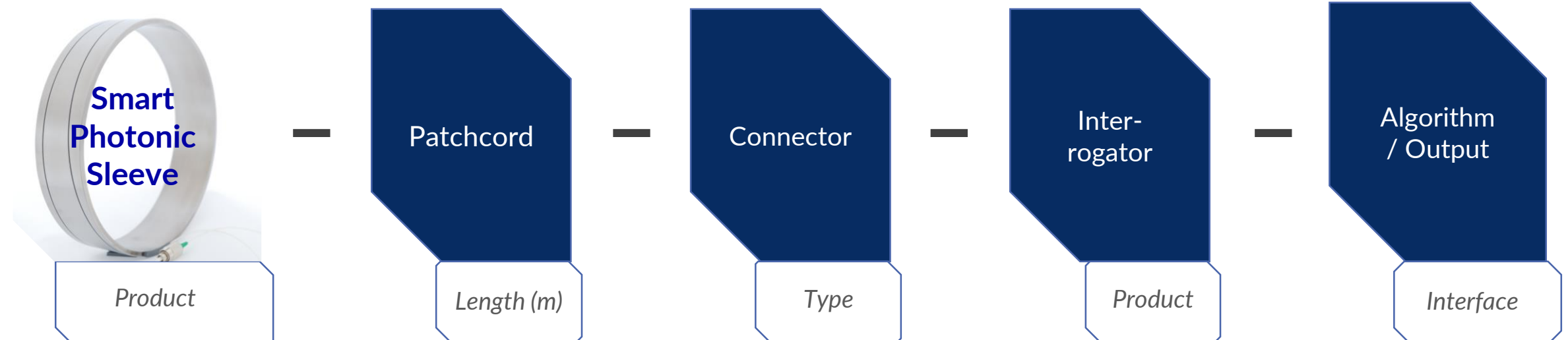
Sensors based on fibre Bragg gratings (FBGs) have numerous advantages over conventional electrical sensor technologies:

- Tolerant of Harsh Environments
- Electrical Immunity
- Intrinsically safe
- Remote Sensing
- Long-Term Stability
- Miniature Size
- Multiplexing
- Fatigue Durability
- Ease and Cost of Installation



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Implementation
5 mm sleeve "ISO (non-intrusive)" (default)
2 mm sleeve "add-on"
2 mm sleeve "integrated"
Customizable position
Sensor arrays customizable

Cable length
10 meter
50 meter
100 meter
Custom

Connector type
FC/APC (default)
SC/APC
None / splice
Other

Brand
Smartfibres (default)
Technobis
Ibsen
Micron optics
Faz
SENTEA

Data format
Raw data
Load, Temp, RPM direct
Dashboard
Condition monitoring solution
Cloud